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2.75-INCH, HYDRA 70, PA151,
ROCKET PALLET FIRST ARTICLE
TESTING (FAT)

DTIC QUALITY

Prepared for:
U.S. Army Armament Research, Development
and Engineering Center
ATTN: AMSTA-AR-ESK
Rock Island, IL 61299-7300

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VALIDATION ENGINEERING DIVISION
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<p>The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SIOAC-DEV), was tasked by U.S. Army Armament Research, Development and Engineering Center (ARDEC) to conduct MIL-STD-1660, Design Criteria for Ammunition Unit Loads, First Article Testing (FAT) on the 2.75-inch, Hydra 70, PA151, rocket pallet produced by Delfasco of Tennessee, Greeneville, TN and Lockheed Martin, Burlington, VT. The MIL-STD-1660 testing revealed several design deficiencies that had to be corrected before the pallet would pass the MIL-STD-1660 test criteria. Modifications that were made to the pallet design included a larger pallet adapter aligning pin and strengthening plates under the pallet deck above the four corner pallet posts. After these modifications were made, the pallets were able to meet MIL-STD-1660 test criteria. (Continued)</p>					
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Prior to discovering these problems, Delfasco and Lockheed Martin had fabricated and welded several hundred pallets and adapter sets. These pallets and adapters did not meet MIL-STD-1660 test criteria so they could not be accepted without modifications. Several attempts were made before an acceptable modification was found. The modification consisted of side reinforcers that were welded to the inside and outside of the four corner posts of the pallet. The modification did not eliminate all the cracking in the deck that occurred during the testing, but did prevent the pallet post from pushing through the deck in a potentially damaging fashion as occurred during the testing of the original pallet design. The modified pallets were approved for U.S. Army (USA)-wide use, but only as a means for utilizing those pallets that were already fabricated. All future pallet production was to use the strengthening plates under the deck above the four corner pallet posts.

U.S. ARMY DEFENSE AMMUNITION CENTER
VALIDATION ENGINEERING DIVISION
SAVANNA, IL 61074-9639

REPORT NO. 96-46

2.75-INCH, HYDRA 70, PA151, ROCKET PALLET FIRST ARTICLE TESTING (FAT)

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PART 1

INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SIOAC-DEV), was tasked by U.S. Army Armament Research, Development and Engineering Center (ARDEC) to conduct MIL-STD-1660, Design Criteria for Ammunition Unit Loads, First Article Testing (FAT) on the 2.75-inch, Hydra 70, PA151, rocket pallet produced by Delfasco of Tennessee, Greeneville, TN and Lockheed Martin, Burlington, VT.

B. AUTHORITY. This test was conducted IAW mission responsibilities delegated by the U.S. Army Armament, Munitions and Chemical Command (AMCCOM), Rock Island, IL. Reference is made to the following:

1. Change 4, 4 October 1974, to AR740-1, 23 April 1973, Storage and Supply Activity Operation.

2. AMCCOM-R, 10-17, Mission and Major Functions of USADACS, 13 January 1986.

C. OBJECTIVE. The objective of the tests was to determine if the pallets produced by Delfasco and Lockheed Martin met MIL-STD-1660 test requirements prior to the acceptance of the pallets by the U.S. Army (USA).

D. CONCLUSION. The original pallet design as produced by Delfasco failed to meet the test criteria of MIL-STD-1660, Design Criteria for Ammunition Unit Loads. The deck of the pallet adapter cracked at the corner posts and the bottom adapter aligning pins sheared off as a result of the repetitive shock test. Modifications were made to the original pallet design to correct these deficiencies. The modifications consisted of an additional thickness of material welded to the

bottom of the pallet deck above the four corner posts and larger diameter aligning pins on the bottom pallet adapter. After these modifications were made, the pallets produced by Delfasco and Lockheed Martin were able to meet MIL-STD-1660 test criteria.

Prior to discovering the design deficiencies, Delfasco and Lockheed Martin had fabricated and welded several hundred pallets and adapters in an effort to get ahead of the production schedule. These pallets and adapters were of the original design and were not capable of meeting MIL-STD-1660 test criteria. In an effort to salvage this production, additional tests were performed to determine if there was a cost-effective modification that could be made to the pallets that would allow them to meet MIL-STD-1660 test criteria. Several attempts were made before an acceptable modification was found. The modifications consisted of side reinforcers that were welded to the inside and outside of the four corner posts of the pallet and a larger diameter bottom adapter aligning pin. The modification did not eliminate all the cracking in the deck that occurred during the testing, but did prevent the pallet post from pushing through the deck in a potentially damaging fashion as occurred during testing of the original pallet design. The pallets with this modification were approved for U.S. Army (USA)-wide use, but only as a means for utilizing those pallets that were already fabricated. All future pallet production was to use the strengthening plates under the deck above the four corner pallet posts.

PART 2

MAY - SEPTEMBER 1996

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PART 3

TEST PROCEDURES

The test procedures outlined in this section were extracted from MIL-STD-1660, Design Criteria for Ammunition Unit Loads, 8 April 1977. This standard identifies nine steps that a unitized load must undergo if it is to be considered acceptable. The four tests that were conducted on the test pallets are summarized below.

A. STACKING TEST. The unit load was loaded to simulate a stack of identical unit loads stacked 16 feet high, for a period of one hour. This stacking load was simulated by subjecting the unit load to a compression weight equal to an equivalent 16-foot stacking height. The compression load was calculated in the following manner. The unit load weight was divided by the unit load height in inches and multiplied by 192. The resulting number was the equivalent compressive force of a 16-foot-high load.

B. REPETITIVE SHOCK TEST. The repetitive shock test was conducted IAW Method 5019, Federal Standard 101. The test procedure is as follows: The test specimen was placed on, but not fastened to, the platform. With the specimen in one position, the platform was vibrated at 1/2-inch amplitude (1-inch double amplitude) starting at a frequency of approximately 3 cycles per second. The frequency was steadily increased until the package left the platform. The resonant frequency was achieved when a 1/16-inch-thick feeler gage momentarily slid freely between every point on the specimen in contact with the platform at some instance during the cycle or a platform acceleration achieved 1 ± 0.1 Gs. Midway into the testing period, the specimen was rotated 90 degrees and the test continued for the duration. Unless failure occurred, the total time of vibration was two hours if the specimen was tested in one position and three hours for more than one position.

C. EDGEWISE ROTATIONAL DROP TEST. This test was conducted using the procedures of Method 5008, Federal Standard 101. The procedure for the edgewise rotational drop test is as follows: The specimen was placed on its skids with one end of the pallet supported on a beam 4-1/2 inches high. The height of the beam was increased if necessary to ensure that there was no support for the skids between the ends of the pallet when dropping took place, but was not high enough to cause the pallet to slide on the supports when the dropped end was raised for the drops. The unsupported end of the pallet was then raised and allowed to fall freely to the concrete, pavement, or similar underlying surface from a prescribed height. Unless otherwise specified, the height of drop for level A protection conforms to the following tabulation:

GROSS WEIGHT (WITHIN RANGE LIMITS) (Pounds)	DIMENSIONS OF ANY EDGE, HEIGHT OR WIDTH (WITHIN RANGE LIMITS) (Inches)	HEIGHT OF DROPS ON EDGES	
		Level A (Inches)	Level B (Inches)
150 - 250	60 - 66	36	27
250 - 400	66 - 72	32	24
400 - 600	72 - 80	28	21
600 - 1,000	80 - 95	24	18
1,000 - 1,500	95 - 114	20	16
1,500 - 2,000	114 - 144	17	14
2,000 - 3,000	Above 145 - No limit	15	12
Above - 3,000		12	9

D. INCLINE-IMPACT TEST. This test was conducted by using the procedure of Method 5023, Incline-Impact Test of Federal Standard 101. The procedure for the incline-impact test is as follows: The specimen was placed on the carriage with the surface or edge to be impacted

projecting at least 2 inches beyond the front end of the carriage. The carriage was brought to a predetermined position on the incline and released. If it was desired to concentrate the impact on any particular position on the container, a 4- by 4-inch timber was attached to the bumper in the desired position before the test. No part of the timber was struck by the carriage. The position of the container on the carriage and the sequence in which surfaces and edges were subjected to impacts was at the option of the testing activity and depends upon the objective of the tests. This test was to determine satisfactory requirements for a container or pack, and, unless otherwise specified, the specimen was subjected to one impact on each surface that has each dimension less than 9.5 feet. Unless otherwise specified, the velocity at time of impact was 7 feet per second.

PART 4

TEST EQUIPMENT

A. Compression Tester.

- | | |
|-----------------------|----------------------|
| 1. Manufacturer: | Ormond Manufacturing |
| 2. Platform: | 60- by 60-inches |
| 3. Compression Limit: | 50,000 pounds |
| 4. Tension Limit: | 50,000 pounds |

B. Transportation Simulator.

- | | |
|------------------|--------------------|
| 1. Manufacturer: | Gaynes Laboratory |
| 2. Capacity: | 6,000-pound pallet |
| 3. Displacement: | 1/2-inch amplitude |
| 4. Speed: | 50 to 400 rpm |
| 5. Platform: | 5- by 8-foot |

C. Inclined Plane.

- | | |
|------------------|--------------------|
| 1. Manufacturer: | Conbur Incline |
| 2. Type: | Impact Tester |
| 3. Grade: | 10 percent incline |
| 4. Length: | 12-foot |

PART 5

TEST RESULTS

The test pallets were inertly-loaded to the specified design weight using two 4- by 4-inch lengths of lumber, two 2- by 4-inch lengths of lumber, and a quantity of ammunition simulant to bring each individual container to the required weight. Special care was taken to ensure that each container had the proper amount of weight in order to achieve a realistic pallet center of gravity (CG). The following sequence of tests were conducted in an effort to:

1. Qualify the Delfasco fabricated and Lockheed Martin welded pallets and adapters that had been fabricated according to the original design specifications then modified in an effort to meet MIL-STD-1660 test criteria.
2. Qualify the Delfasco fabricated and Lockheed Martin welded pallets and adapters constructed with the modified design.
3. Qualify the Delfasco fabricated and welded pallets and adapters with the modified design.

Unless otherwise noted, all the pallets and adapters in the following test sequences are Delfasco fabricated and Lockheed Martin welded.

A. Pallet 1. Pallet No. 1 from the initial first article submissions.

Date:	20 May 1996
Weight:	2,030 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 8,960 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 60 minutes at 230 rpm. During a routine inspection, the containers and bottom adapter were noted to have shifted approximately 2 inches relative to the pallet base. Further inspection revealed that the adapter aligning pins on the bottom adapter had sheared off during the vibration. No additional testing was conducted on this pallet.

B. Pallet 2. Pallet No. 2 from the initial first article submissions. Bottom adapter and pallet modified to accept the larger adapter pin AC200000453-6.

Date:	22 May 1996
Weight:	2,030 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 8,960 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 235 rpm in the longitudinal orientation and 90 minutes at 175 rpm in the lateral orientation. Several small cracks were noted to have formed in the pallet posts next to the pallet skids at the completion of the longitudinal vibration test. No additional cracking was noted at the completion of the lateral vibration.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped from a height of 24-inches on the longitudinal drops and 14-inches on the lateral drops.

4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the toplift was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8-feet. No additional damage was noted at the completion of the test.

6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. Two of the cracks that were noted during the vibration test were determined to be severe enough to allow the pallet post to penetrate into the pallet load. Because of the severity of the deck cracking, the test pallet was considered to have failed MIL-STD-1660 test criteria.

C. Pallet 3. Pallet No. 3 from the initial first article submissions. Bottom adapter and pallet modified to accept the larger adapter pin AC200000453-6.

Date:	23 May 1996
Weight:	2,030 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 8,960 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 225 rpm in the longitudinal orientation and 90 minutes at 175 rpm in the lateral orientation. Upon completion of the longitudinal vibration, the pallet was elevated and inspected from the bottom side. Cracks were noted to have formed around the pallet posts at the bell end of the pallet.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped 24-inches on the bell end of the pallet and 14 inches on the first lateral drop. The remainder of the drops were conducted at 15 inches after the discovery of the change in drop height specifications was noted. As a result of the drop tests, the bell end of the pallet had the posts pushed through the pallet deck into the bottom adapter while the non-bell end of the pallet did not show the same type of damage.

4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the toplift was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8-feet. No additional damage was noted at the completion of the test.

6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. No additional damage was noted to have occurred since the inspection after the edgewise rotational drop tests. Because of the severity of the deck cracking, the test pallet was considered to have failed MIL-STD-1660 test criteria.

D. Pallet 4. Pallet No. 1 modified from the initial first article submissions. Bottom adapter and pallet modified to accept the larger adapter pin AC200000453-6. Testing restarted at the point where the adapter pins failed during the longitudinal vibration testing previously conducted on 20 May 1996.

Date:	24 may 1996
Weight:	2,030 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Repetitive Shock Test. The test pallet was vibrated 30 minutes at 220 rpm in the longitudinal orientation to complete the longitudinal orientation started on 20 May 1996. Minor cracks were noted in the pallet posts next to the skid at the completion of the longitudinal orientation. The test pallet was then vibrated 90 minutes at 165 rpm. Upon completion of the lateral orientation, the test pallet was elevated so the bottom of the pallet deck could be inspected. The cracks noted at the completion of the longitudinal orientation had not increased significantly. Cracks were noted to have formed in the pallet base around the corner posts of the pallet.

2. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped 15-inches on all four sides of the pallet. No additional cracking was noted to have occurred in the pallet based when inspected from the bottom side of the pallet.

3. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the top-lift was noted.

4. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8-feet. No additional damage was noted upon completion of the test.

5. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. Three of the four corner posts of the pallet were noted to have pushed up through the pallet deck into the bottom adapter. Since this damage represented a potential hazard to the containers on the pallet, the pallet was considered to have failed MIL-STD-1660 testing.

E. Pallet 5. Pallet No. 1 from the second submission of pallets and adapters. The bottom adapter and pallet were modified to accept the larger adapter pin AC200000453-6 and the side reinforcers on the four corner posts. The initial side reinforcers that were used extended up to

the bottom of the pallet base on the inside of the corner posts but stopped at the strengthening bend on the pallet deck on the outside of the corner pallet posts (see photographs on pages 6-14 and 6-15).

Date:	12 June 1996
Weight:	2,035 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 8,985 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 235 rpm in the longitudinal orientation. Upon completion of the longitudinal vibration, the pallet deck was noted to have cracked at the strengthening bend where the outer side reinforcers had been welded to the deck material. No additional testing was conducted on this pallet.

F. Pallet 6. Pallet No. 2 from the second submission of pallets and adapters. The bottom adapter and pallet were modified to accept the larger adapter pin AC200000453-6 and the side reinforcers on the four corner posts. The portion of the outside reinforcers that was welded to the strengthening bend on the pallet base was ground off to prevent the deck cracking that took place on the previous pallet.

Date:	12 June 1996
Weight:	2,035 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 8,985 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 225 rpm in the longitudinal orientation and 90 minutes at 135 rpm in the lateral orientation. Upon completion of the longitudinal vibration, the pallet was elevated and inspected from the bottom side. Small cracks were noted to have formed on the outer edges of the pallet base on the outer edges of two corner posts. No change was noted in the cracking after the lateral orientation.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped 15-inches on all four sides. No change in the cracks was noted after the completion of the rotational drops.

4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the top-lift was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8-feet. No additional damage was noted at the completion of the test.

6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. The cracks that occurred during the longitudinal vibration were noted to be more substantial when viewed from the top side of the pallet base. Because of the severity of the deck cracking, the test pallet was considered to have failed MIL-STD-1660 testing.

G. Pallet 7. Pallet No. 1 from the third submission of pallets and adapters. The bottom adapter and pallet were modified to accept the larger adapter pin AC200000453-6 and the side reinforcers on the four corner posts. The second set of side reinforcers that were used extended up to the bottom of the pallet base on both sides of the corner posts.

Date: 06-24-96
Weight: 2,035 pounds
Length: 70-3/4 inches
Width: 29-3/8 inches
Height: 43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 8,985 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 225 rpm in the longitudinal orientation and 90 minutes at 170 rpm in the lateral orientation. Upon completion of the longitudinal vibration, the pallet was elevated and inspected from the bottom side. Small cracks were noted to have formed in the pallet posts along the skid. No cracking in the pallet deck was evident when viewed from the bottom side of the pallet.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped 15-inches on all four sides. No change in the cracks was noted after the completion of the rotational drops.

4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the top-lift was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8-feet. No additional damage was noted at the completion of the test.

6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. Small cracks were noted to have formed in the pallet deck on the inside portion of the corner posts. Since the side reinforcers prevented the pallet post from pushing up through the pallet base into the bottom adapter, the pallet was considered to have passed MIL-STD-1660 testing.

H. Pallet 8. Pallet No. 1 from the first submission of pallets and adapters with the strengthening plates added to the bottom side of the pallet base above the four corner posts.

Date:	24 June 1996
Weight:	2,035 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 8,985 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 215 rpm in the longitudinal orientation and 90 minutes at 170 rpm in the lateral orientation. Upon completion of the longitudinal vibration, the pallet was elevated and inspected from the bottom side. Small cracks were noted to have formed in the pallet posts along the skid and two cracks were noted to have formed in two of the corner posts next to the strengthening plates.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped 15-inches on all four sides. No change in the cracks was noted after the completion of the rotational drops.

4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the top-lift was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8-feet. No additional damage was noted at the completion of the test.

6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. The cracks that were noted after the longitudinal orientation of the repetitive shock test had not propagated. No cracking was noted

in the pallet deck material.

I. Pallet 9. Pallet No. 2 from the third submission of pallets and adapters. The bottom adapter and pallet were modified to accept the larger adapter pin AC200000453-6 and the side reinforcers on the four corner posts. The second set of side reinforcers used extended up to the bottom of the pallet base on both sides of the corner posts.

Date:	25 June 1996
Weight:	2,035 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 8,985 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 220 rpm in the longitudinal orientation and 90 minutes at 165 rpm in the lateral orientation. Upon completion of the longitudinal vibration, the pallet was elevated and inspected from the bottom side. Small cracks were noted to have formed in the pallet posts along the skid.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped 15-inches on all four sides. No change in the cracks was noted after the completion of the rotational drops.

4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the top-lift was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8-feet. No additional damage was noted at the completion of the test.

6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. The cracks that were noted after the longitudinal orientation of the repetitive shock test had not propagated. Minor cracking was noted to have formed in the pallet deck material at the inside corners of the four corner posts. Since the side reinforcers prevented the pallet post from pushing up through the pallet base into the bottom adapter, the pallet was considered to have passed MIL-STD-1660 testing.

J. Pallet 10. Pallet No. 2 from the first submission of pallets and adapters with the strengthening plates added to the bottom side of the pallet base above the four corner posts.

Date:	26 June 1996
Weight:	2,035 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 8,985 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 225 rpm in the longitudinal orientation and 90 minutes at 170 rpm in the lateral orientation. Upon completion of the longitudinal vibration, the pallet was elevated and inspected from the bottom side. Small cracks were noted to have formed in the pallet posts along the skid.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped 15-inches on all four sides. No change in the cracks was noted after the completion of the rotational drops.

4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the top-lift was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8-feet. No additional damage was noted at the completion of the test.

6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. The cracks that were noted after the longitudinal orientation of the repetitive shock test had not propagated. No cracking was noted in the pallet deck material. Two cracks were also noted to have formed in two of the four corner posts next to the strengthening plates.

K. Pallet 11. Pallet No. 1 from the first article submission of pallets and adapters that was fabricated and welded by Delfasco.

Date:	18 September 1996
Weight:	2,040 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 9,000 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 205 rpm in the longitudinal orientation and 90 minutes at 175 rpm in the lateral orientation. Upon completion of the longitudinal vibration, the pallet was elevated and inspected from the bottom side. Small cracks were noted to have formed in the pallet posts along the skid.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped 15-inches on all four sides. No change in the cracks was noted after the completion of the rotational drops.

4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the top-lift was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8-feet. No additional damage was noted at the completion of the test.

6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. The cracks that were noted after the longitudinal orientation of the repetitive shock test had not propagated. No cracking was noted in the pallet deck material.

L. Pallet 12. Pallet No. 2 from the first article submission of pallets and adapters that was fabricated and welded by Delfasco.

Date:	20 September 1996
Weight:	2,040 pounds
Length:	70-3/4 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 9,000 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 225 rpm in the longitudinal orientation and 90 minutes at 165 rpm in the lateral orientation. Upon completion of the longitudinal vibration, the pallet was elevated and inspected from the bottom side. Small cracks were noted to have formed in the pallet posts along the skid.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped 15 inches on all four sides. No change in the cracks was noted after the completion of the rotational drops.

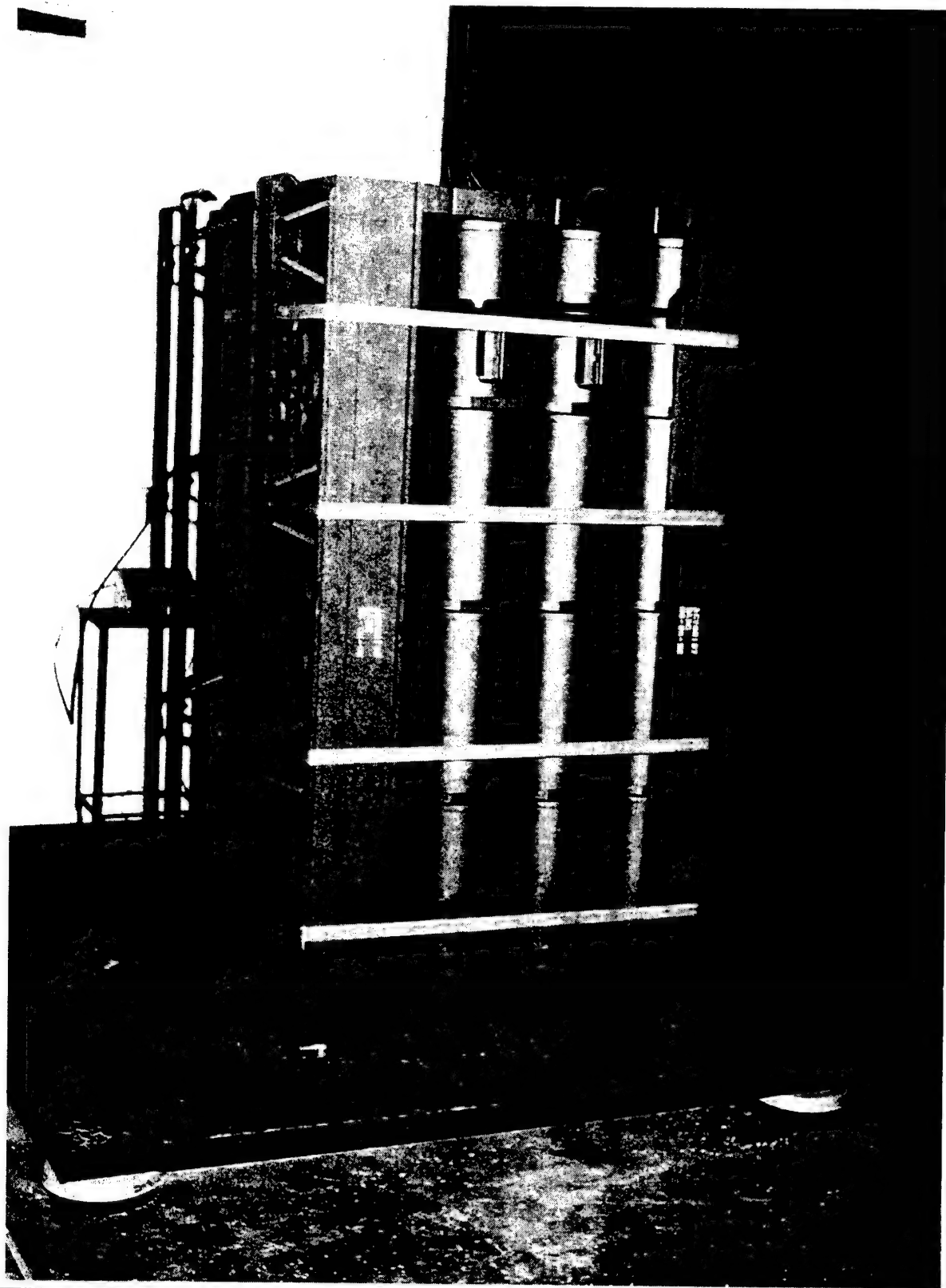
4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by 4-points, 3-points, 2-diagonal points, 2 adjacent-points, and 1-point. No shifting of the containers or permanent deformation of the top-lift was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8-feet. No additional damage was noted at the completion of the test.

6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. The cracks that were noted after the longitudinal orientation of the repetitive shock test had not propagated. No cracking was noted in the pallet deck material.

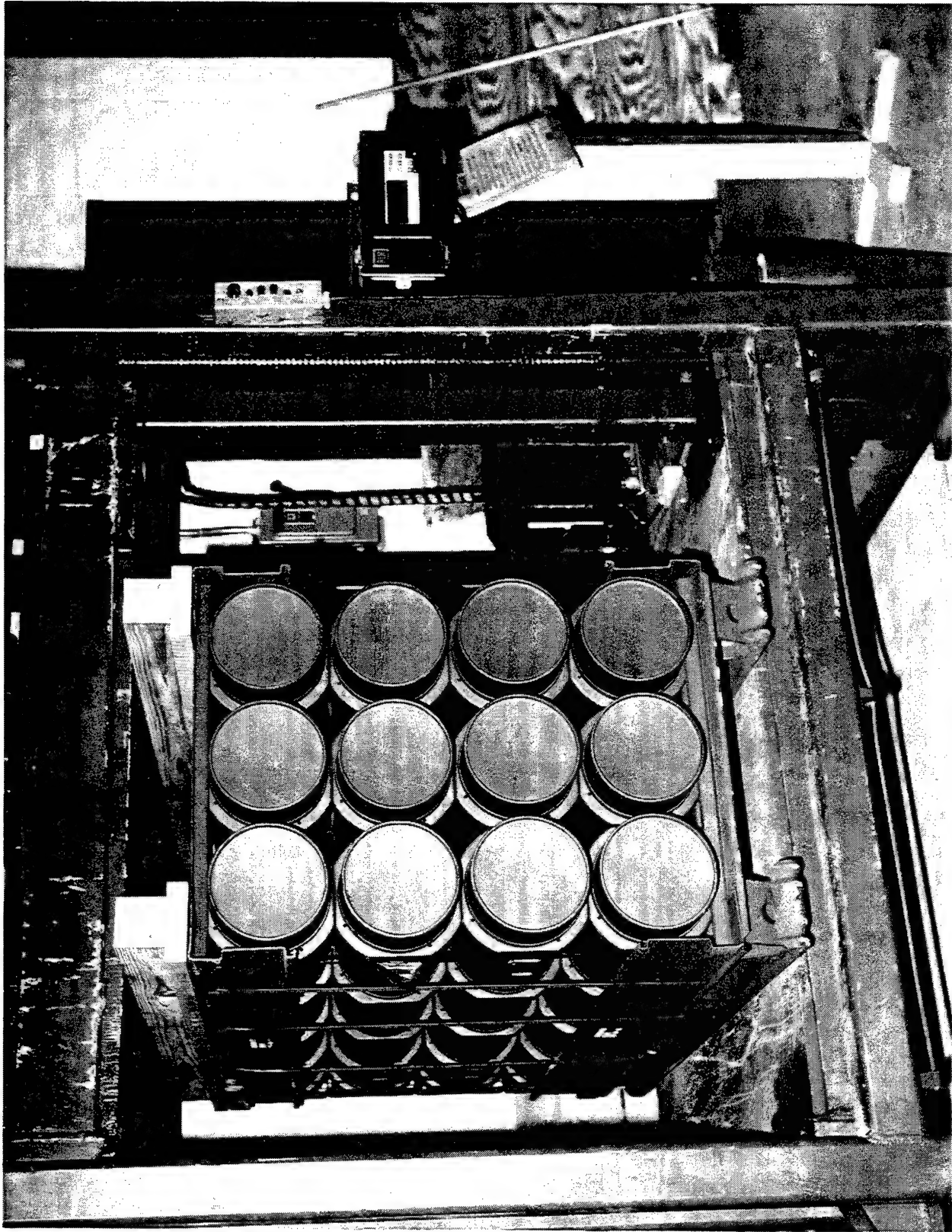
PART 6

PHOTOGRAPHS



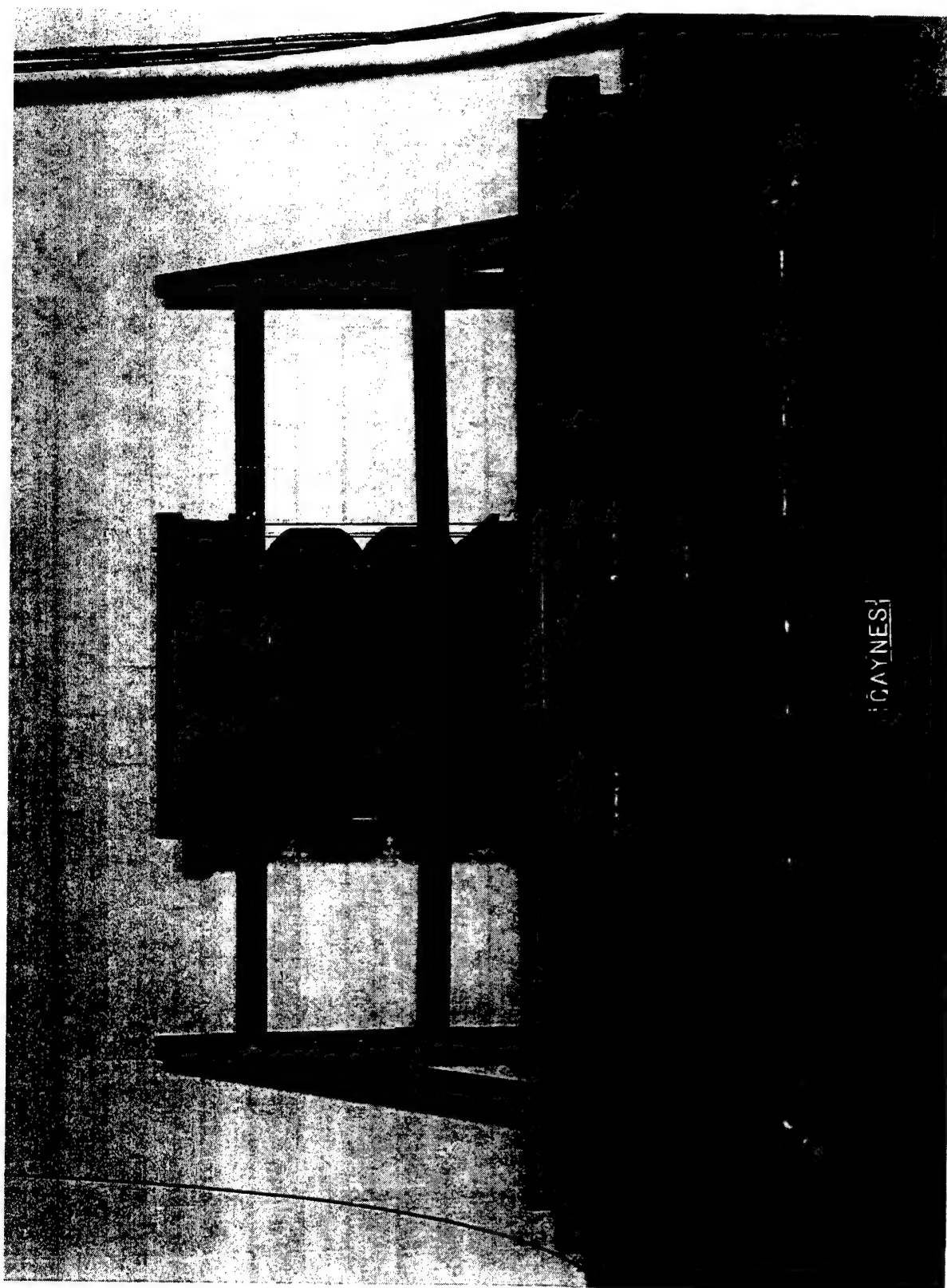
	U.S. ARMY DEFENSE AMMUNITION CENTER SAVANNA, IL	
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PHOTO NO. A0317-SCN-96-145-2556. This photograph shows the pallet positioned on the scale during the inert loading of the containers.		
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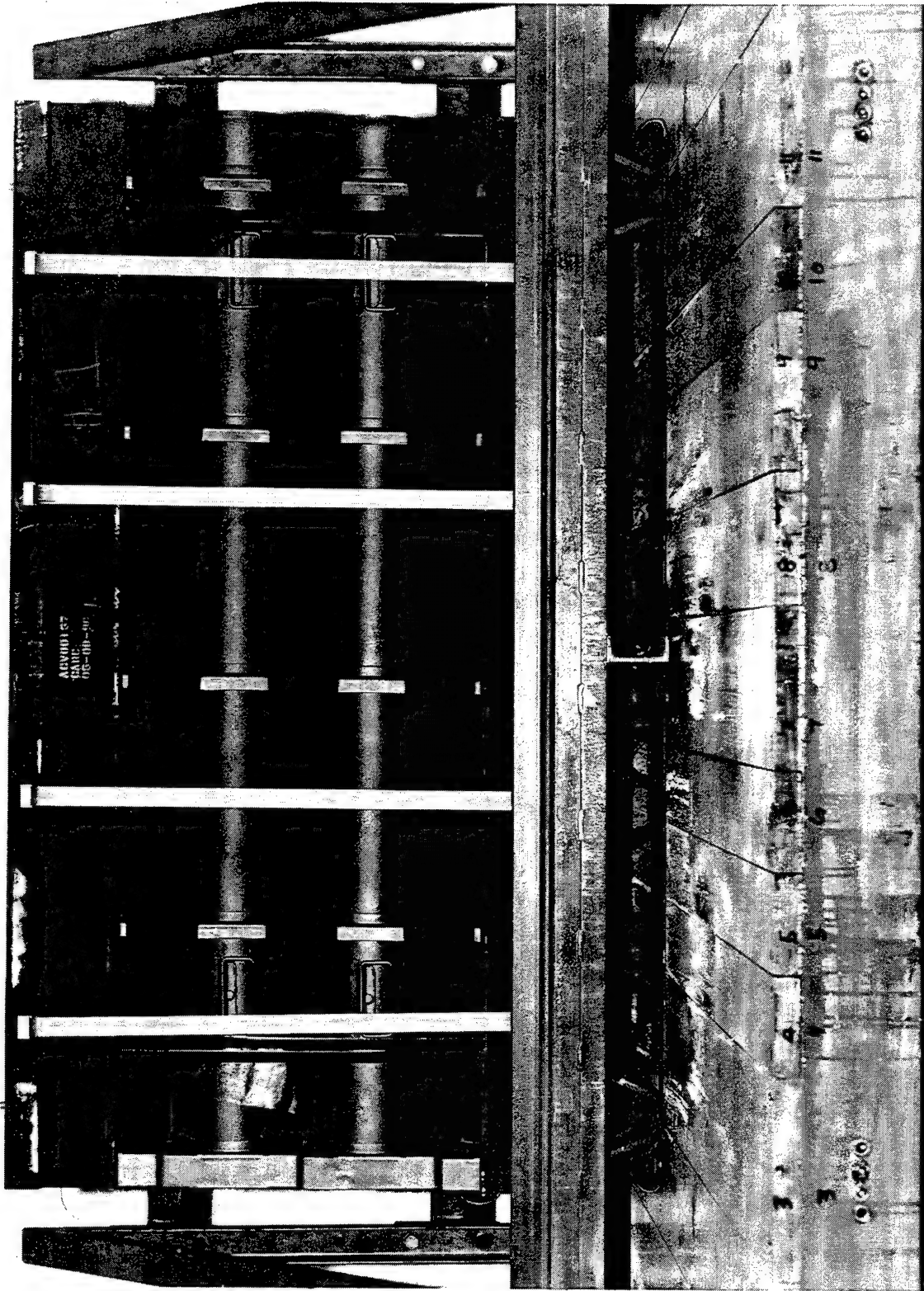
U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL

PHOTO NO. A0317-SCN-96-145-2555. This photograph shows the pallet during the compression test.



DAYNES

	U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL	
PHOTO NO. A0317-SCN-96-145-4300. This photograph shows the pallet on the shaker table in the longitudinal orientation.		

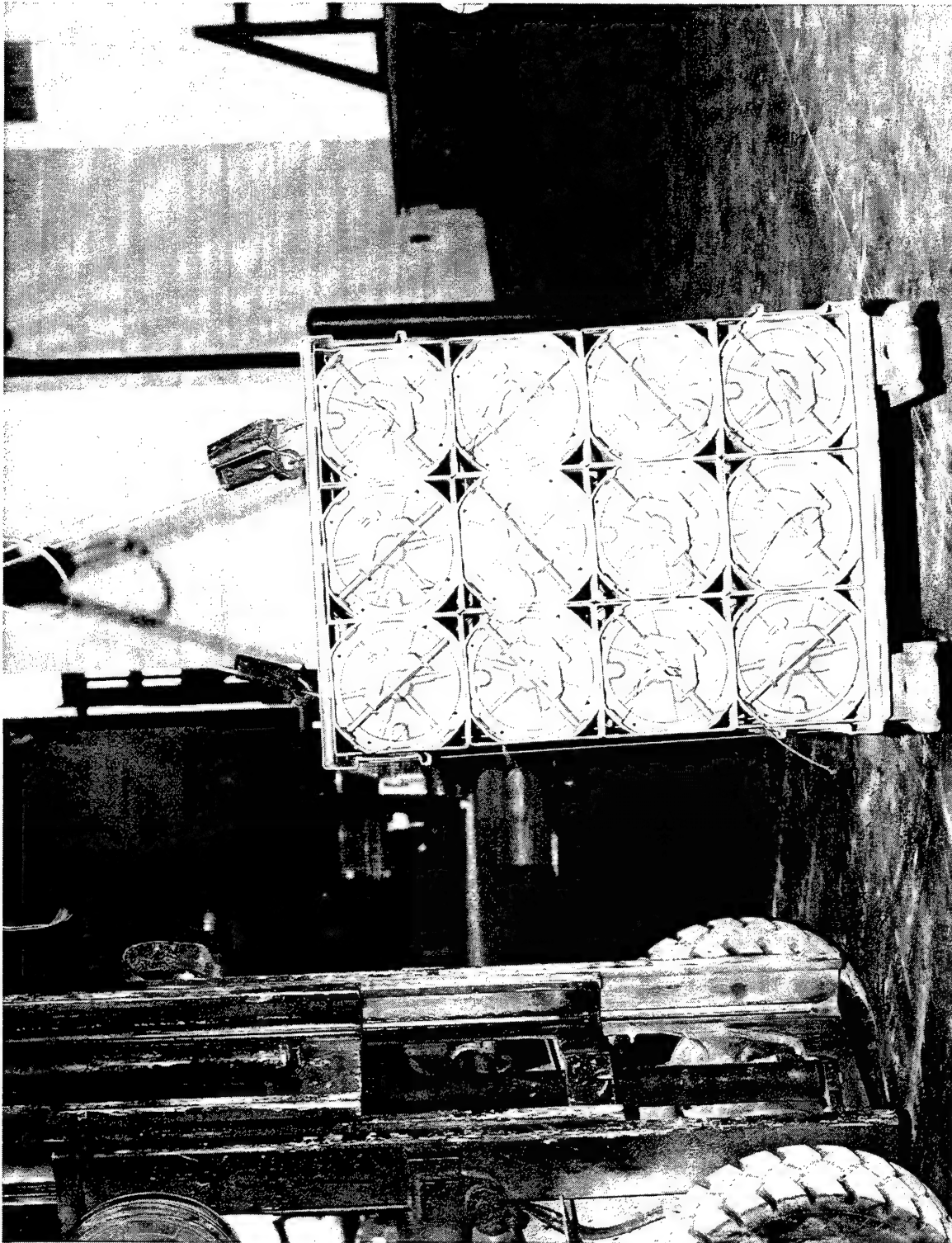


U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL

PHOTO NO. A0317-SCN-96-145-3534. This photograph shows the pallet on the shaker table in the lateral orientation.

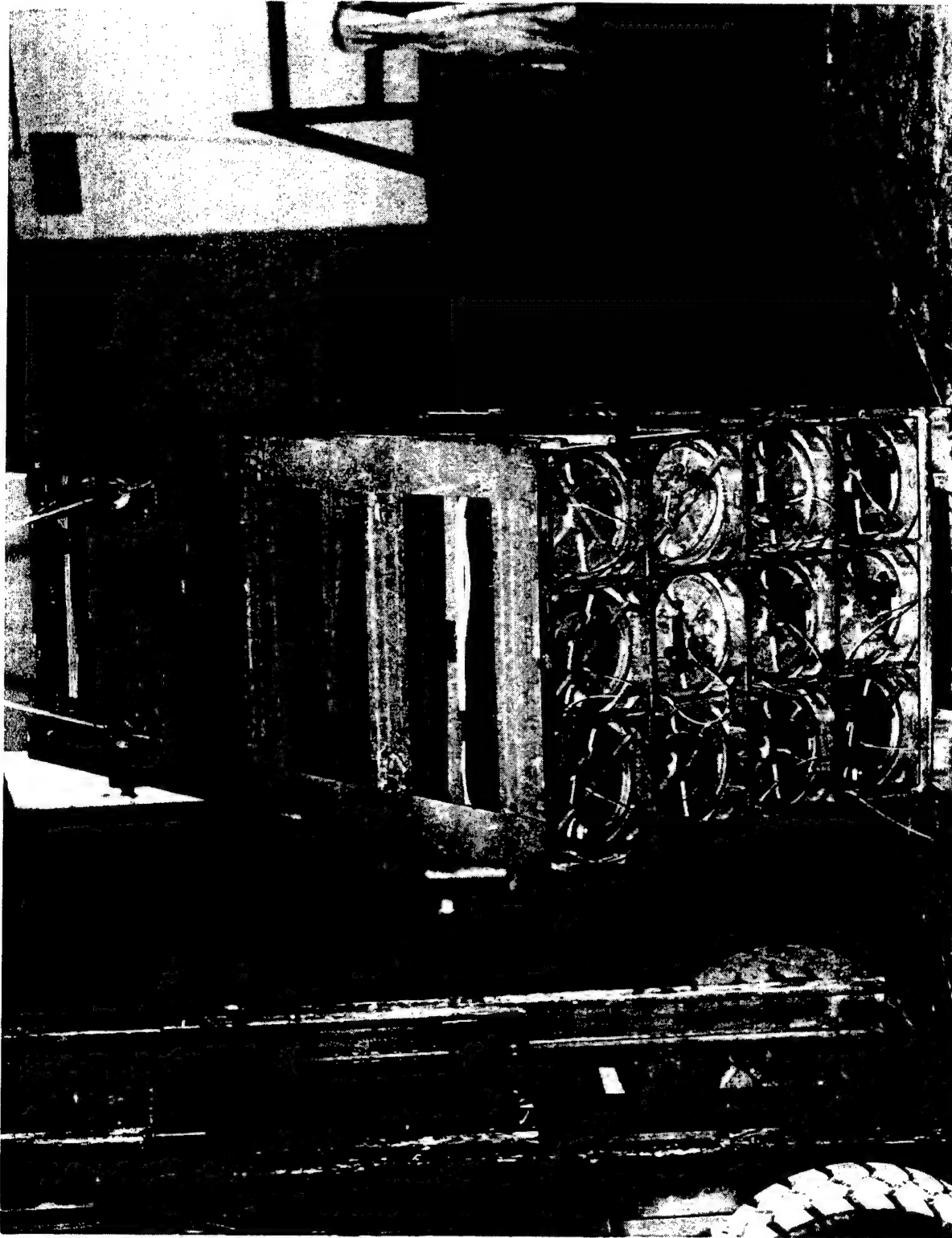


	U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL	
PHOTO NO. A0317-SCN-96-145-3517. This photograph shows the pallet prior to a lateral edgewise rotational drop.		

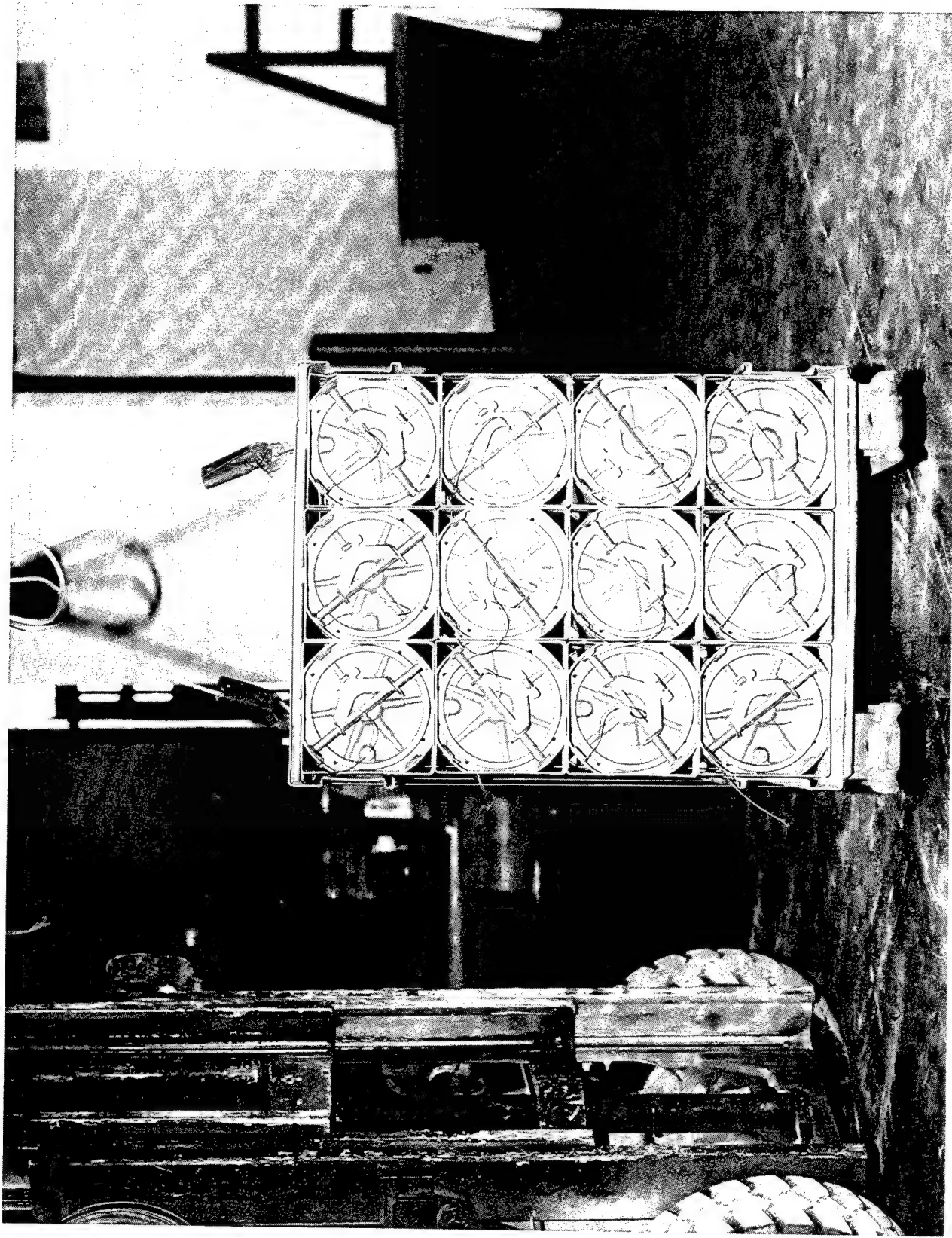


U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL

PHOTO NO. A0317-SCN-96-145-3520. This photograph shows the pallet being lifted by three points during the sling compatibility test.

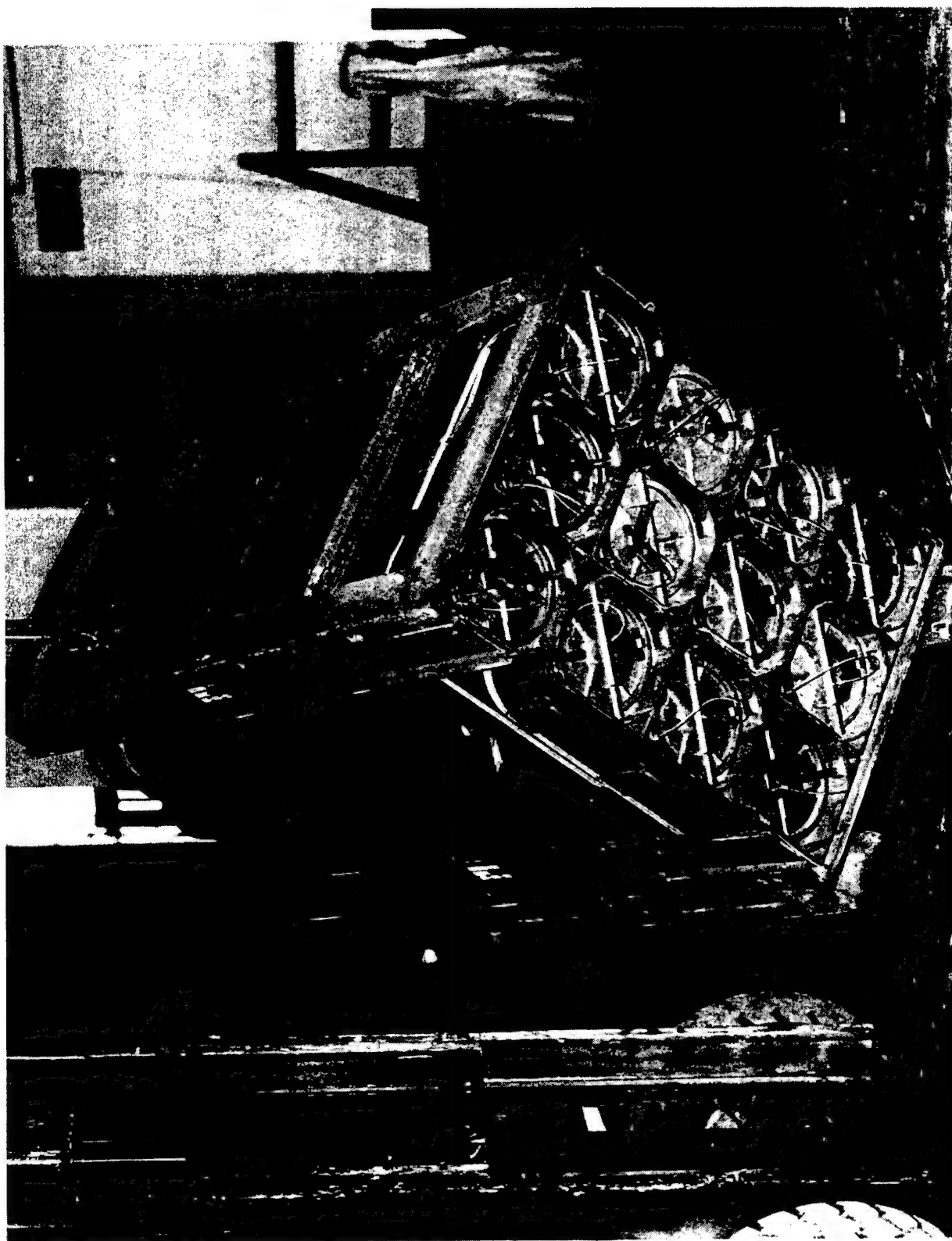


	U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL	
PHOTO NO. A0317-SCN-96-145-3522. This photograph shows the pallet being lifted by two adjacent points during the sling compatibility test.		



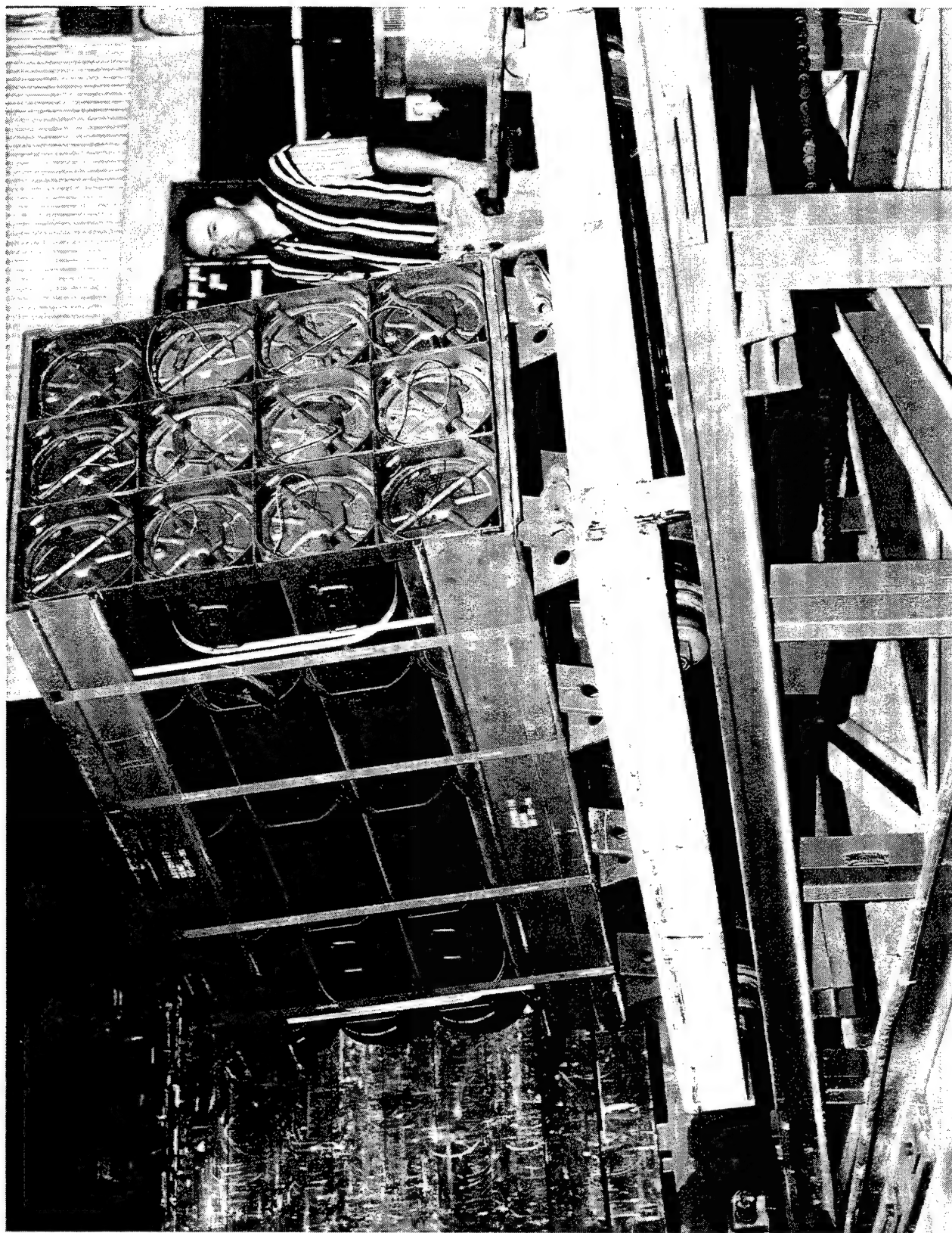
U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL

PHOTO NO. A0317-SCN-96-145-3521. This photograph shows the pallet being lifted by two diagonal points during the sling compatibility test.



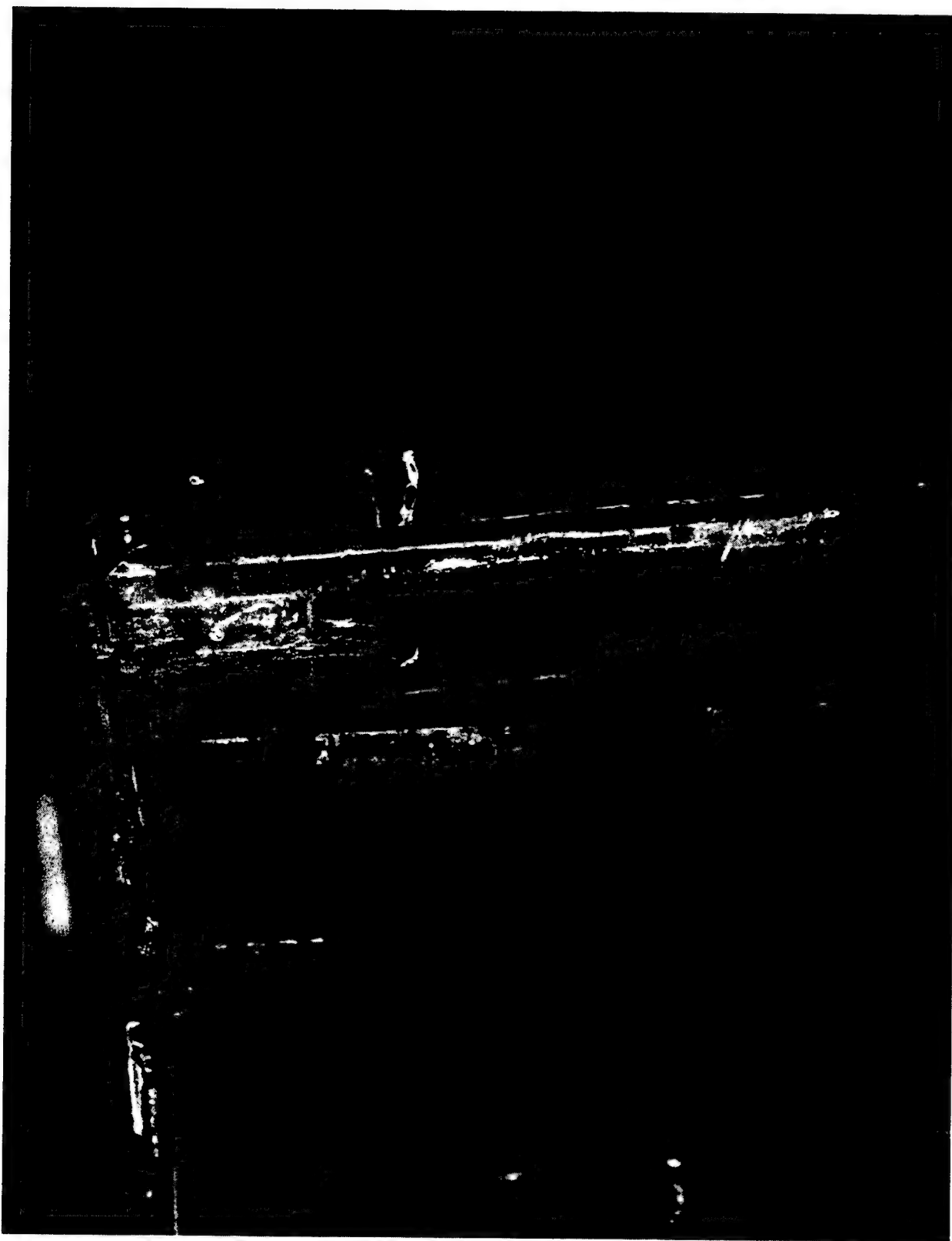
U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL

PHOTO NO. A0317-SCN-96-145-3523. This photograph shows the pallet being lifted by one point during the sling compatibility test.



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PHOTO NO. A0317-SCN-96-145-3524. This photograph shows the pallet on the incline-impact tester.



	U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL	
PHOTO NO. A0317-SCN-96-145-3541. This photograph shows some of the damage that occurred during MIL-STD-1660 testing.		

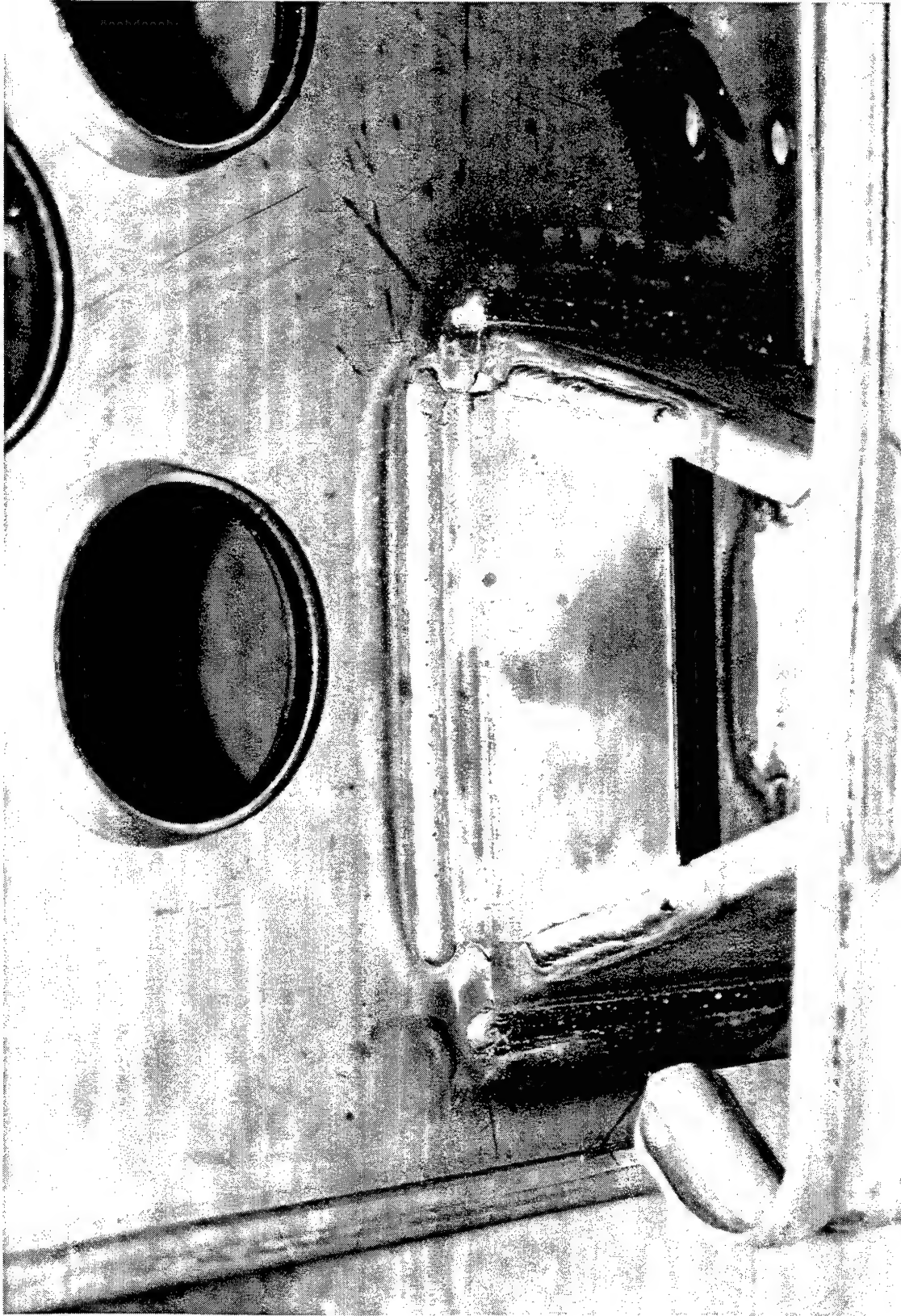


U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL

PHOTO NO. A0317-SCN-96-145-3543. This photograph shows additional damage that occurred during MIL-STD-1660 testing.



	U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL	
PHOTO NO. A0317-SCN-96-4010. This photograph shows the outer side reinforcer that was added to the pallet post in an effort to stop the cracking that was occurring in the pallet deck.		



U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL

PHOTO NO. A0317-SCN-96-4014. This photograph shows the inner side reinforcer that was added to the pallet post in an effort to stop the cracking that was occurring in the pallet deck.



	U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL	
PHOTO NO. A0317-SCN-96-4023. This photograph shows one of the cracks that formed in the pallet deck due to the addition of the side reinforcer.		



U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL

PHOTO NO. A0317-SCN-96-4012. This photograph shows the alternate position for the outer side reinforcer. The alternate position of the outer side reinforcer only allows for welding to the pallet deck from inside the pallet post.



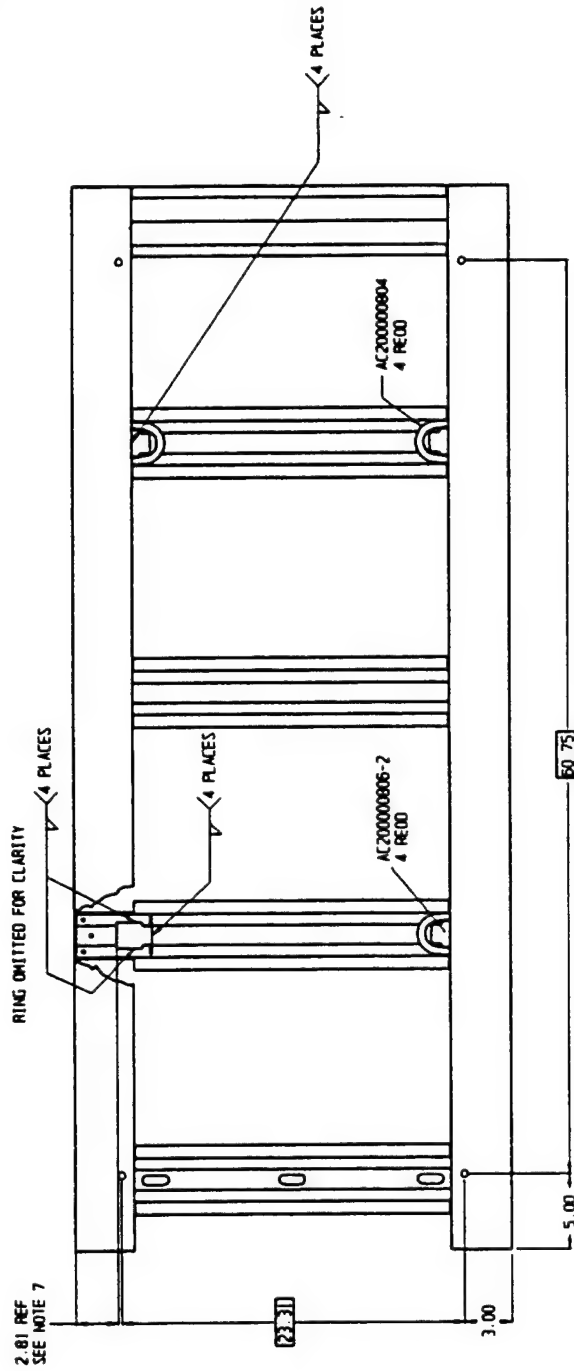
U.S. ARMY DEFENSE AMMUNITION CENTER - SAVANNA, IL

PHOTO NO. A0317-SCN-96-4031. This photograph shows the extra piece of metal that was welded to the pallet deck to strengthen the area where the corner posts attach.

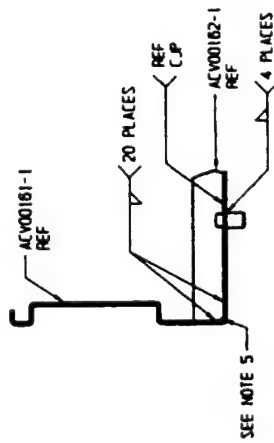
PART 7

DRAWINGS

REV	DESCRIPTION	DATE	APPROVED
1	PRODUCT BASELINE	94-03-25	SCHULTZ
2	FOR MFG	94-03-25	
3	FOR MFG	95-06-22	
4	(EOP MFG004) 95-02-22		
5	(EOP MFG004) 95-03-18		



VIEW A-A



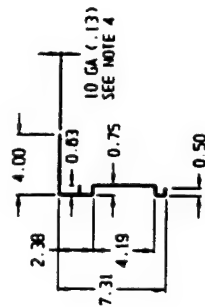
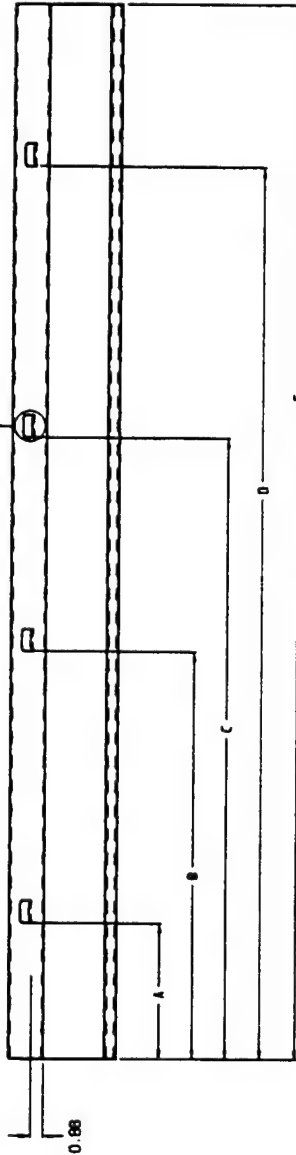
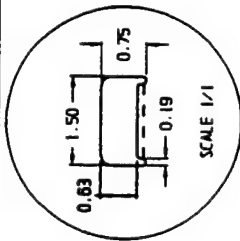
SECTION B-B
SCALE 1/2

		REV		DATE		DESCRIPTION		DRAWN BY		CHECKED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY		DATE		APPROVED BY</	
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NOTES:

1. BEND RADIUS 0.13 INCH MAX WHERE NOT NOTED.
2. ANSI Y14.5M-1982, MIL-A-2550 AND MIL-A-70788 APPLY.
3. MATERIAL: SHEET, SAE OR AISI 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL.
4. PER ASTM A568, (ASTM A368 OR A568).

PARTS ACV00161-2 AND ACV00161-4 MAY BE MADE OF 12 GA (.10) MATERIAL.



DIMENSION					
PART NO	A	B	C	D	E
ACV00161-1	9.75	24.75	44.50	59.50	70.75
ACV00161-2	---	---	---	---	70.75
ACV00161-3	9.00	27.00	49.92	68.00	78.50
ACV00161-4	---	---	---	---	78.50

DISTRIBUTION STATEMENT A:

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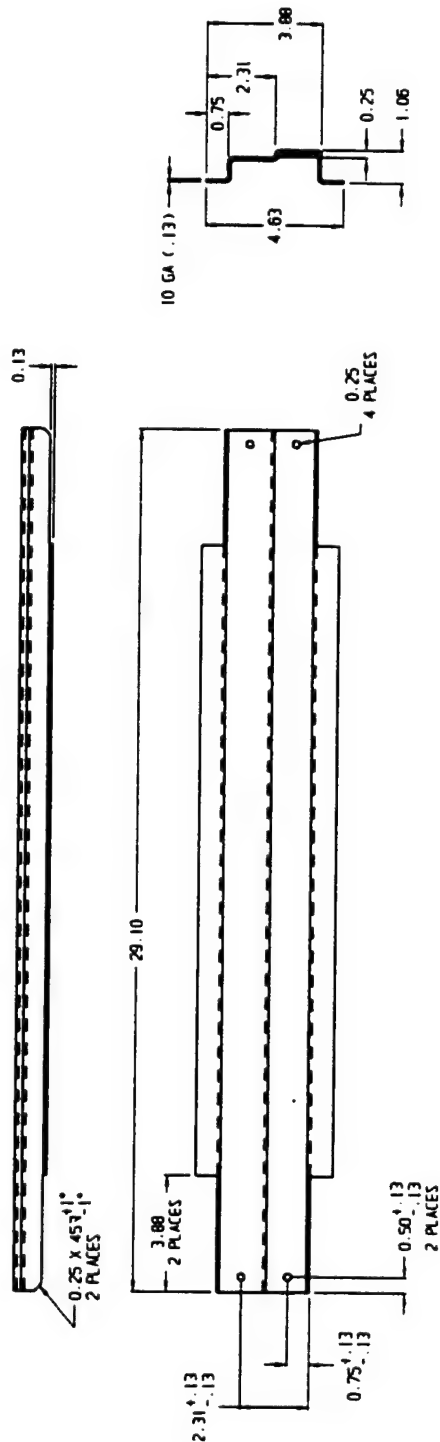
SEE PARTS LIST

DATE: 94-03-25 BY: [Signature] FOR: [Signature]		DATE: 94-03-25 BY: [Signature] FOR: [Signature]	
TITLE: SIDE RAIL PART NO: ACV00161		UNIT: 1/2 SCALE: 1/1	

REV	DESCRIPTION	DATE	APPROVED
1	PRODUCT BASELINE	94-03-25	94-03-25 SCHULTZ
2	REVISED	95-06-22	95-06-22

NOTES:

1. BEND RADIUS 0.13 INCH MAX WHERE NOT NOTED.
2. ANST Y14-54-1982, MIL-A-2550 AND MIL-A 70788 APPLY.
3. MATERIAL: SHEET, SAE OR ANST 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL, PER ANST A568, (ASTM A368 OR A569).



PART NO ACV00163

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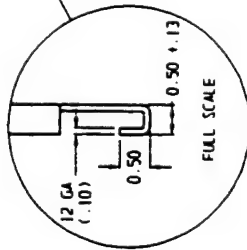
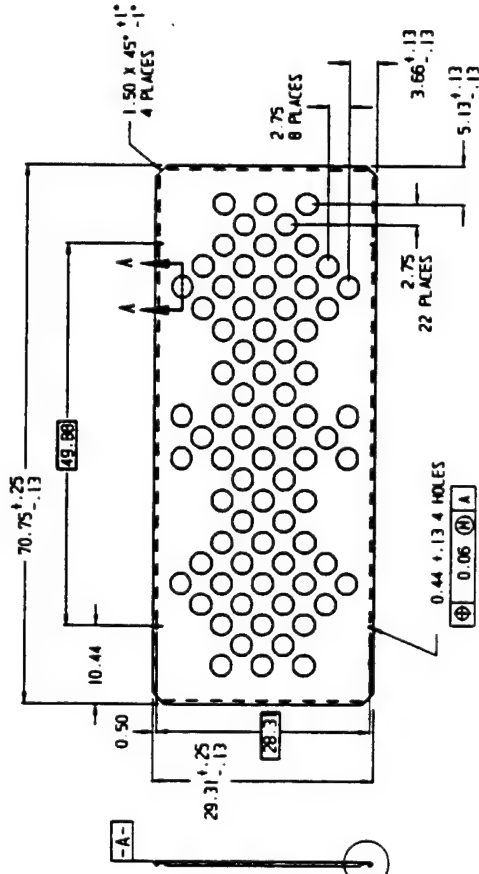
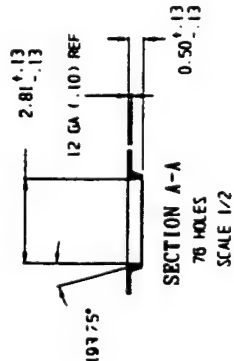
REV	DESCRIPTION	DATE	APPROVED
1	PRODUCT BASELINE	04-03-25	94-03-25 SCHULTZ
2	FOR MFG	04-03-25	94-03-25 SCHULTZ
3	FOR MFG	04-03-25	94-03-25 SCHULTZ
4	FOR MFG	04-03-25	94-03-25 SCHULTZ
5	FOR MFG	04-03-25	94-03-25 SCHULTZ

REV	DESCRIPTION	DATE	APPROVED
1	PRODUCT BASELINE	04-03-25	94-03-25 SCHULTZ
2	FOR MFG	04-03-25	94-03-25 SCHULTZ
3	FOR MFG	04-03-25	94-03-25 SCHULTZ
4	FOR MFG	04-03-25	94-03-25 SCHULTZ
5	FOR MFG	04-03-25	94-03-25 SCHULTZ

ACV00163

NOTES:

1. BEND RADIUS 0.13 INCH MAX WHERE NOT NOTED.
2. ANST Y14-SH-1002, MIL-A-2550 AND MIL-P-70708 APPLY.
3. MATERIAL: SHEET, SAE OR ANST 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL, PER ASTM A568, (ASTM A368 OR A569).



SOME HIDDEN LINES OMITTED FOR CLARITY

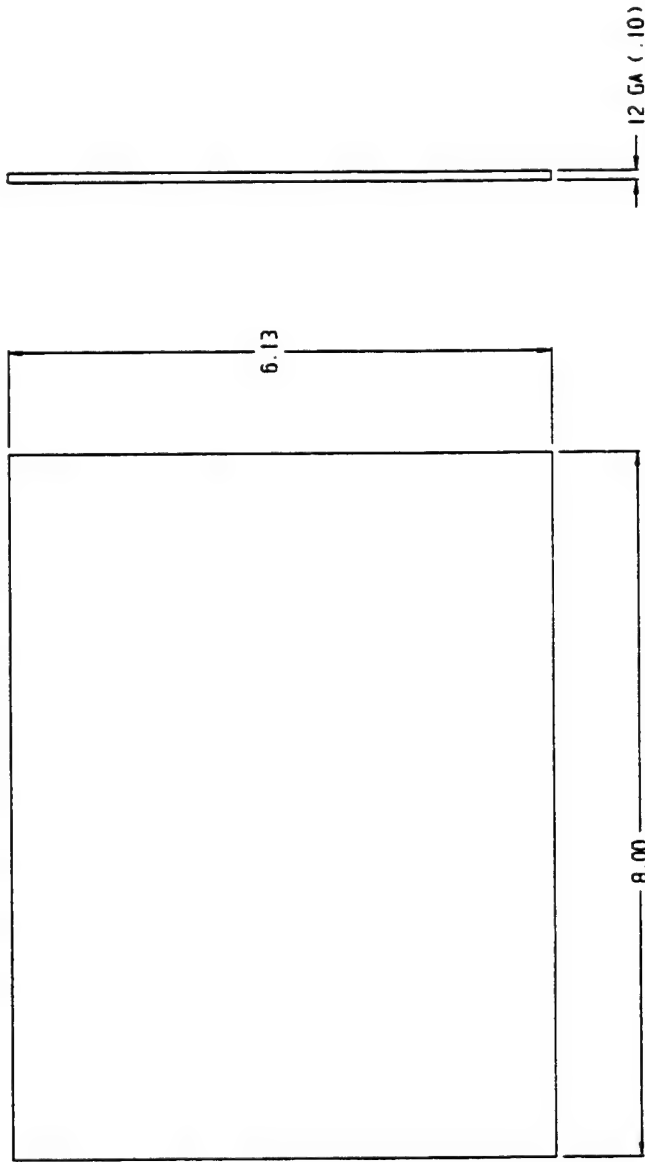
PART NO ACV00166

DISTRIBUTION STATEMENT A:
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DESIGN AUTHORITY		DATE	
DESIGNED BY	DATE	DESIGNED BY	DATE
DRN	94-03-25	DRN	94-03-25
BLK	SMS	BLK	SMS
DESIGNED BY	T. J. MICHELS	DESIGNED BY	T. J. MICHELS
DESIGNED BY	V. F. ERNST	DESIGNED BY	V. F. ERNST
DESIGNED BY	WILLIAM F. ERNST	DESIGNED BY	WILLIAM F. ERNST
APPLICATION		PART NO	
ACV00166		ACV00166	
SHEET 1 OF 1		SHEET 1 OF 1	

NOTES:

1. ANSI Y14.5M-1982, MIL-A-2550 AND MIL-P-70786 APPLY.
2. MATERIAL: SHEET, SAE OR ANSI 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL, PER ASTM A568, (ASTM A366 OR A569).



PART NO ACV00307

DISTRIBUTION STATEMENT A.

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REVISION		DATE		APPROVED	
LTR	DESCRIPTION	YY-MM-DD	YY-MM-DD	YY-MM-DD	YY-MM-DD
-	PRODUCT BASELINE ERR 000000	YY-MM-DD	YY-MM-DD	YY-MM-DD	YY-MM-DD

DATE		96-06-05		DESIGN ACTIVITY		U.S. ARMY INDUSTRIAL OPERATIONS CORPS DEFENSE MANUFACTURING CENTER SAVANNAH, ILLINOIS 61074-9839	
BY	CHKD	DATE	DATE	BY	CHKD	DATE	DATE
B.K.	T.M.	96-06-05	96-06-05	BY	CHKD	DATE	DATE
UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES.				DRAWN BY: B.K. T.M. MICHELS			
TOLERANCES ON FRACTIONS				DECIMALS			
.13				.13			
NATURAL				NATURAL			
ACV00165 2.75 HYDRA				ACV00165 2.75 HYDRA			
ACV00164 ROCKET				ACV00164 ROCKET			
NEXT ASSY USED ON				NEXT ASSY USED ON			
APPLICATION				APPLICATION			
POST SUPPORT PLATE				POST SUPPORT PLATE			
SIZE				CAGE CODE			
C				28620			
SCALE				UNIT			
1/1				VT			
SHEET				OF			
1				1			

1. DETAIL REQUIREMENTS FOR SURFACE PREPARATION (CLEANING AND PRETREATMENT) TO BARE METAL PRIOR TO PRIMING AND PAINTING.

- 1.1 ALL SURFACES SHALL BE THOROUGHLY CLEANED SUCH THAT THE BARE METAL SURFACES ARE FREE FROM OIL, GREASE, DIRT, SCALE, RUST, FOREIGN MATTER AND LOOSE WELD SPATTER. THE CLEANING METHOD SHALL BE IN ACCORDANCE WITH ANY METHOD IN TABLE IV OF MIL-STD-171, OR AS SPECIFIED IN PARAGRAPH 3.1 OF MIL-1704. PARTICULAR CARE MUST BE TAKEN TO REMOVE WELD SLAG AND LOOSE WELD SPATTER FROM WELDS AND ADJACENT AREAS.
- 1.2 IMMEDIATELY AFTER CLEANING, ANY SOLVENTS OR MOISTURE SHALL BE COMPLETELY REMOVED. THESE CLEAN DRY SURFACES SHALL THEN HAVE A PRETREATMENT APPLIED IN ACCORDANCE WITH MIL-STD-171. FOR STEEL SUBSTRATES THE PRETREATMENT TO USE IS ZINC PHOSPHATE, FINISH NO. 5.1.1, IRON PHOSPHATE, FINISH NO. 5.1.2 OR WASH PRIMER, FINISH NO. 5.2.
- 1.3 IMMEDIATELY PRIOR TO PRIMING, ALL SURFACES WHICH HAVE BEEN CLEANED AND PRETREATED IN ACCORDANCE WITH PARAGRAPH 1.1 AND 1.2 SHALL BE CHECKED FOR THOROUGH CLEANNESS. ANY ACCUMULATION OF OIL, GREASE, DIRT, RESIDUES FROM THE CLEANING PROCESS OR ANY FOREIGN MATERIAL SHALL BE COMPLETELY REMOVED. THE USE OF SOLVENTS MEETING THE REQUIREMENTS OF TABLE IV, FINISH NO. 4.3 OF MIL-STD-171, IS ACCEPTABLE. THE COMPLETE DRYING OF ANY SOLVENTS OR MOISTURE IS ESSENTIAL.

2. DETAIL REQUIREMENTS FOR APPLICATION OF ANTI-CORROSIVE PRIMER PAINT.

- 2.1 PRIMER SHALL BE APPLIED ON ALL SURFACES IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS AND PARAGRAPHS 5.2.1 AND 5.2.2 OF MIL-STD-171 (EXCEPT THAT WHEN ACCELERATED DRYING IS EMPLOYED, OVEN TEMPERATURE IS NOT TO EXCEED 200 DEGREES F). MIL-P-53022 OR MIL-P-53030 MAY BE USED ON EITHER FERROUS OR NON-FERROUS MATERIALS.
- 2.2 ONE COAT OF PRIMER SHALL BE APPLIED AS PROMPTLY AS POSSIBLE AFTER THE SURFACES HAVE BEEN PREPARED AND CLEANED BY THE AFOREMENTIONED PROCEDURES. THE PRIMER SHALL BE DRY TO THE TOUCH IN ACCORDANCE WITH MIL-C-53072. ALL EPOXY PRIMERS SHALL BE PROPERLY DRIED BEFORE TOPCOATING. PRIMER DRY FILM THICKNESS SHALL BE APPLIED TO ATTAIN THE 336 HOUR SALT SPRAY REQUIREMENT. RECOMMENDED THICKNESS RANGE IS .0010 TO .0035 INCHES (.0254 TO .0889 MM).
3. DETAIL REQUIREMENTS FOR APPLICATION OF POLYURETHANE TOPCOAT PAINT.
- 3.1 TOPCOAT SHALL BE APPLIED ON EXTERIOR SURFACES ONLY IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS OR PARAGRAPHS 5.2.1 AND 5.2.2 OF MIL-STD-171, UNLESS OTHERWISE SPECIFIED. THE TOPCOAT COLOR SHALL BE GREEN NO. 383 IN ACCORDANCE WITH MIL-C-46168 OR MIL-C-53039.
- 3.2 TOPCOAT DRY FILM THICKNESS OF MIL-C-46168 AND MIL-C-53039 SHALL BE .0018 TO .0035 INCHES (.0457 TO .0889 MM) TOTAL APPLIED IN TWO COATS. THE SECOND COAT MAY BE APPLIED IN ACCORDANCE WITH MIL-C-53072 OR MANUFACTURERS' RECOMMENDATIONS.
- 3.3 ALL REWORK SHALL BE IN ACCORDANCE WITH PARAGRAPH 3.6.1 OF MIL-C-53072.
- 3.4 ALTERNATE COATINGS MAY BE USED IF APPROVED BY THE CONTRACTING OFFICER.

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REVISION		
LTR	DESCRIPTION	DATE
A	CHANGE PAINT THICKNESS REQUIREMENTS	87-09-17
B	PRODUCT BASELINE ERR M8K9450 NOR M2T4200 92-07-20 (ECP M3T4030 93-11-02)	89-04-10
C	(ECP M4T3005 94-06-02)	TT
D	NOR M5T8003 95-05-09	SCHULTZ
E	NOR M5T3003 95-06-22 (ECP M6R3004) 96-02-22	94-11-02 95-06-07 96-04-11

4. DETAIL REQUIREMENTS FOR APPLICATION TO PREVIOUSLY PAINTED SUBSTRATES.

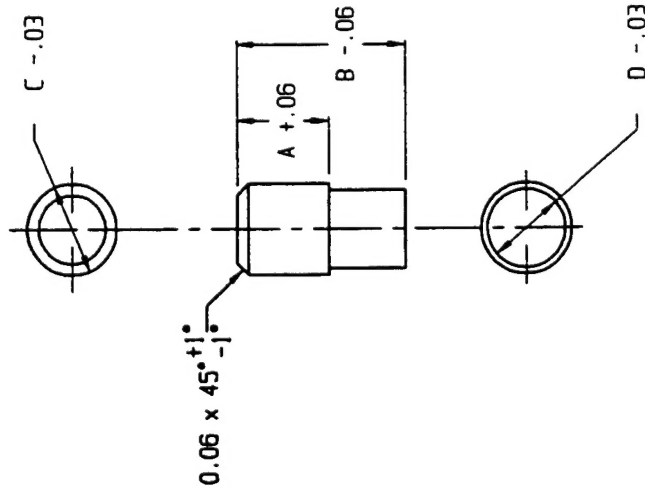
- 4.1 ALL PREVIOUSLY PAINTED SURFACES MUST BE CLEAN AND FREE FROM RUST. WHERE RUST EXISTS, MECHANICAL CLEANING IN ACCORDANCE WITH FINISH NO. 4.1 OF MIL-STD-171 (WIREBRUSH IS ACCEPTABLE) SHALL BE PERFORMED UNTIL BRIGHT METAL IS EXPOSED. ONE COAT OF POLYURETHANE PAINT PER MIL-C-46168 OR MIL-C-53039 CAN BE APPLIED DIRECTLY OVER EXISTING ENAMEL OR POLYURETHANE COATINGS WITHOUT ANY ADDITIONAL SURFACE PREPARATION EXCEPT CLEANING. IF THE SURFACE IS BROKEN DOWN TO THE SUBSTRATE, THAT AREA MUST BE CLEANED, PRETREATED, PRIMED AND TOPCOATED PER PARAGRAPH 1 THROUGH 3. THE POLYURETHANE COATING SHALL NOT HOWEVER, BE DIRECTLY APPLIED OVER LACQUER. THE LACQUER MUST BE REMOVED DOWN TO THE BARE METAL BEFORE POLYURETHANE COATING IS APPLIED PER PARAGRAPHS 1 THROUGH 3.
- 4.2 WHERE VENDOR PARTS ARE SUPPLIED TO THE PRIME ORIGINAL EQUIPMENT MANUFACTURER (OEM) ALREADY ENAMEL PAINTED, THE PRIME OEM WILL HAVE TO REPAINT PER PARAGRAPH 4.1 BY APPLYING DIRECTLY OVER THE EXISTING ENAMEL COATING. IF THE VENDOR PARTS ARRIVE JUST ENAMEL PRIMED (WHICH IS PREFERABLE), WITH SPECIFICATION PRIMERS SUCH AS TT-P-1757 OR TT-P-664, THEN THE POLYURETHANE PAINT PER PARAGRAPH 4.1 WILL BE APPLIED DIRECTLY OVER PRIMED SURFACES. IF THE ENAMELS ON THE VENDOR PARTS ARE OF A COMMERCIAL OR UNKNOWN TYPE THEY MUST BE TESTED BEFORE THE POLYURETHANE CAN BE APPLIED. THIS ENTAILS APPLYING POLYURETHANE PAINT TO A SMALL AREA OF THE PART AND OBSERVING FOR A PERIOD OF 15 MINUTES FOR ANY DEFECTS SUCH AS BLISTERING, DELAMINATION OR BLEEDING. IF NONE ARE OBSERVED, THE REMAINDER OF THE PARTS CAN BE PAINTED. IF THERE IS A DEFECT, THE PARTS MUST BE CLEANED, PRETREATED, PRIMED AND TOPCOATED AS PREVIOUSLY DESCRIBED FOR BARE SUBSTRATES IN PARAGRAPH 1 THROUGH 3.

5. TESTING.

- 5.1 PALLETTS AND/OR ADAPTERS FINISHED IN ACCORDANCE WITH PARAGRAPH 2.3, AND 4 AS APPLICABLE SHALL BE TESTED FOR PAINT ADHESION USING ACTUAL PRODUCTION ITEMS.
- 5.2 THE PRIMER AND TOPCOAT SHALL BE ADHESION TESTED IN ACCORDANCE WITH PARAGRAPH 4.2.7.2 OF TT-C-490.
- 5.3 THE PRIMER AND TOPCOAT SHALL BE TESTED IN PARAGRAPH 4.2.8 OF TT-C-490.
- 5.4 MIL-C-53072, PARAGRAPH 4.3.3.7 APPLIES.

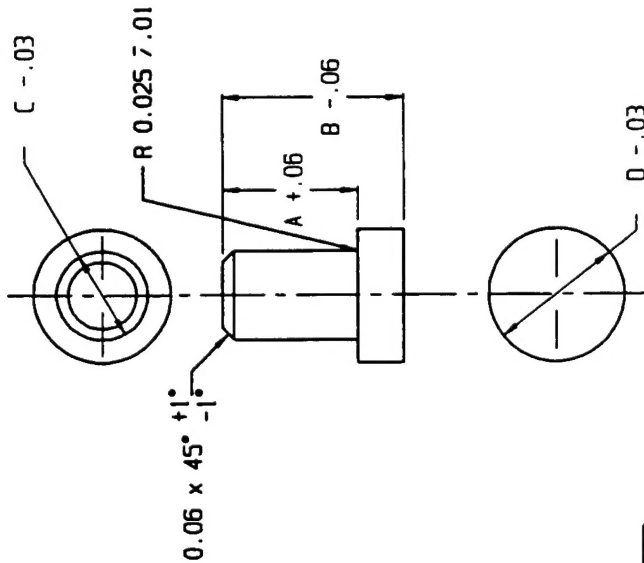
UNLESS OTHERWISE NOTED, DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES.		DATE 86-05-09		DESIGN ACTIVITY	
TOLERANCES ON		CHANGER	PROJ MGR	U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND DEFENSE APPLICATION CENTER AND SCHOOL SAVANNAH, ILLINOIS 61074-9836	
FRACTIONS		DH	KD	CHEMICAL AGENT RESISTANT COATING (CARC) FINISHING REQUIREMENTS FOR METAL PALLETTS AND/OR PALLET ADAPTERS	
DECIMALS		SCALE-OUT		SIZE	
ANGLES		SUBMITTED		CAGE CODE	
MATERIAL		T. J. MICHELS		C 28020	
		W. F. ERNST		AC200000423	
		APPROVED BY OFFICE OF CONTRACTING OFFICER		SCALE NONE	
		JOHN L. BYRD, JR.		UNIT VT	
		DEFENSE APPLICATION CENTER AND SCHOOL		SHEET 1 OF 1	
NEXT ASSY		USED ON			
APPLICATION					

- NOTES:
1. ANSI Y14.5M-82 APPLIES.
 2. MATERIAL: STEEL, 1018 OR 1020, PER ASTM A36.

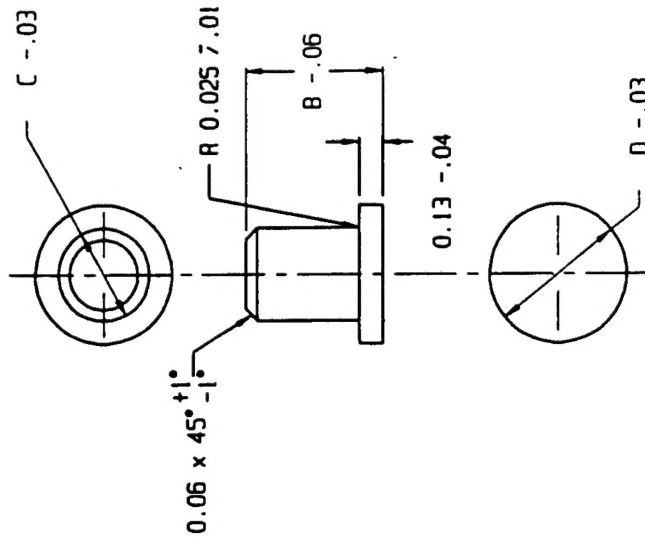


PART NO AC200000453-1
 PART NO AC200000453-2
 PART NO AC200000453-5

DIMENSION				
PART NO	A	B	C	D
AC200000453-1	.63	1.00	.50	.43
AC200000453-2	.50	.75	.31	.25
AC200000453-3	.75	1.00	.50	.75
AC200000453-4	N/A	.75	.31	.56
AC200000453-5	.63	.69	.37	.31



PART NO AC200000453-3



PART NO AC200000453-4

REVISION		
LTR	DESCRIPTION	DATE
-	PRODUCT BASELINE ERR M8K9450	89-04-10 TPT
A	NOR M9T3051 89-04-26	89-06-23 FRIED
B	ECP M9T3082-009 89-08-16	90-09-24 DREIER
C	ECP M0A2201-001 90-10-19	90-12-07 SCHULTZ
D	NOR M2T4200 92-07-20	
E	(ECP M4T3005 94-06-02)	94-11-02 SCHULTZ
	NOR M5T3003 95-06-22	96-04-11

DESIGN ACTIVITY		U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND DEFENSE AMMUNITION CENTER AND SCHOOL SAVANNAH, ILLINOIS 61074-9030	
DATE 87-06-05		DESIGNER M.J.J. DREIER	
BY J.G. M.J.J. DREIER		CHECKED T.J. MICHELS	
TITLE LUG-ALIGNING METAL PALLET		SUBMITTER W. F. ERNST	
SCALE 2/1		UNIT WT	
CAGE CODE C 28620		AC200000453	
SIZE		SHEET 1 OF 1	

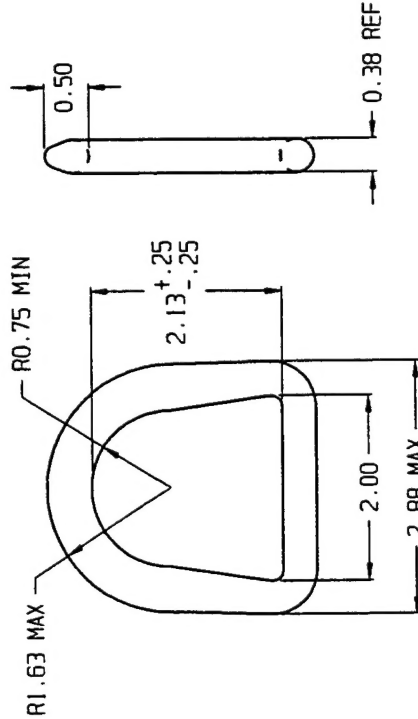
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NOTES:

1. FRAME: 'D'-RING, 0.38 STOCK DIA, 4140 STEEL, 5,000# SAFE WORKING LOAD, ULTIMATE STRENGTH 13,000# OR GREATER.
2. PLATING: IMMERSION ZINC FLAKE/CHROMATE DISPERSION MIL-C-87115.
3. DIMENSIONS SHOWN ARE ENVELOPE DIMENSIONS NECESSARY FOR THE RING TO MATE WITH THE RING RETAINER AND TO PERFORM ITS INTENDED FUNCTION.
4. IDENTIFICATION OF THE SUGGESTED SOURCE(S) HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY AS A SOURCE OF SUPPLY FOR THE ITEM(S).

SUGGESTED SOURCES OF SUPPLY		
SUPPLIER DATA		
CAGE	PART NUMBER	NAME AND ADDRESS
16007	1070	U.S. FORGECAST CORP. P.O. BOX 387 FT. SMITH, AR 72902
6V480	204-115	HELGESEN INDUSTRIES, INC. 7261 HIGHWAY 60 WEST HARTFORD, WI 53027



SPECIFICATION CONTROL DRAWING

DATE		89-03-10		DESIGN ACTIVITY		U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND DEFENSE AMMUNITION CENTER AND SCHOOL SAVANNAH, ILLINOIS 61074-9839	
DESIGN	ENGINEER	PROJ. NO.		WM	JK	T. J. MICHELS	
JG	MJJ	DREIER		WM	JK	T. J. MICHELS	
UNLESS OTHERWISE NOTED, DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES.				MATERIAL			
TOLERANCES ON FRACTIONS DECIMALS				MATERIAL			
NEXT ASSY				USED ON			
APPLICATION				LIFTING RING			
CAGE CODE				AC200000804			
SIZE				C 28620			
SCALE				1/1 UNIT WT			
SHEET				1 OF 1			

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